

THE DYNAMISM OF ECO-ORGANIC FOOD PRODUCTS & CONSUMER INTENTIONS FOR PURCHASING

APARNA GOYAL¹ & SANJEEV BANSAL²

¹Associate Professor, Amity Business School, Amity University, Uttar Pradesh, India

²Professor & Dean FMS, Amity Business School, Amity University, Uttar Pradesh, India

ABSTRACT

The research tries to understand the intention and perception of consumers in buying the organic food products. The demographic profile of the consumers who purchase the eco-natural organic food products were understood in this attempt. Data were collected in supermarkets within 3 different areas Delhi NCR using mall-intercept approach. 277 respondents were interviewed using the survey method of primary data collection. The data obtained from the survey were analyzed using chi-square test, ANOVA, correlation analysis and multiple linear regression tests. Result indicated that the intention to purchase Eco-natural products was heavily influenced by the perception on Eco-natural product worth of purchase and the belief on the safety and health aspect of the product. Respondents were divided into two groups, one that of the buyers of organic food and the other of non-buyers. Among the Eco-natural buyers, majority consumers believed Eco-natural food to be healthier, tastier and better as compared to non-organic traditionally cultivated food. The study tries to estimate the existing awareness and understanding of the outlay and rewards of Eco-natural organic farming across innumerate levels viz. generation, environmental, marketer, and consumer purchase dimensions. Eco-natural organic farming shows many potential rewards that mainly include higher biodiversity and improved soil and water quality, enhanced profitability, and higher nutritional value as well as many potential outlay including lower yields and higher consumer prices. However, numerous important dimensions have high uncertainty, particularly the environmental performance when controlling for lower Eco-natural yields, but also yield stability, soil erosion, water use, and labor conditions. The study is an effort to identify conditions that influence the relative acceptance and performance of Eco-natural farming products, highlighting areas for increased research and policy support. Lack of sustainability, today is a leading cause of environmental decadence. Despite major increases in the generation of natural food items, developing countries like India seem to follow and adapt at a slower pace. Eco-natural organic farming has been proposed as a solution to achieving sustainable food protection.

KEYWORDS: Eco-natural Foods, Consumer Behaviour, Purchase Intention, Environmental Friendly & Organic

Received: Dec 25, 2017; **Accepted:** Jan 15, 2018; **Published:** Feb 03, 2018; **Paper Id.:** IJBMRFEB20186

INTRODUCTION

Contextual Background

Eco-natural is a label that is recognized and purchased by many consumers. Eco-natural organic farming is the fastest-growing food sector in India. This is the most apt alternative for covering the sustainable food protection challenges. The study has the objective of understanding the rewards of organic eco-farming and find out the different variables that are leading to greater growth and awareness of organically cultivated food items. The following variables were assessed viz. Generation, Climate, Producers, and Consumers. The above variables have been examined first from the existing research studies available which are the quantitative literature review

and then these variables were studied in depth to know the level of performance for each one. Eco-natural organic farming is a standard method adopted by the producers where the cultivation of crops avoids the usage of artificial insecticides, pesticides or fertilizers. The study also tries to assess the benefits of consuming organic food over its non-organic counterparts, meaning which there has been inculcation of the positive effects on human health by consuming the eco-organic vegetables and foods. The research used different designs of secondary research available, including reports of studies on human beings, including clinical trials on human beings, cohort studies, and other cross-sectional studies.

The review of literature was designed to assess the strength of evidence of the nutrition-related benefits by eating the Eco-natural organic food. Further, the reviewed articles helped in providing direction towards achieving the objectives of research. The review of literature includes human studies that are either random or non-random or case studies, surveys, articles and the like. The literature review indicated the hypothesis that organic farming methods provide rich nutrients as compared to the traditional farming approach. Eco-natural organic farming is a more sustainable alternative to current predominant traditional farming. Many studies point to the need to increase food generation to meet the needs of a growing human population (26). The requirement of organic food production is debated because of the inefficiencies in the traditional methods (27), organic yield and consumption matters due to their positive environmental outcomes. The food produced naturally will also give nutritional health benefits as compared to the production done using insecticides, pesticides, etc. (Fig. 1 and fig. S1) (16–23). A study importantly reveals that the Eco-natural food produced in India reveals an average production gap of about 20% (22, 41). However, the impact or intensity of this is different for different types of agricultural produces and the types of crop management being used (Table 1) (16–21)]. It has been observed that the different practices lead to a range of gaps in the organic production viz. from 5 to 9% under some management practices, and as high as up to 40% under other conditions (28–31). Studies have analyzed the productivity in terms of per unit area in case of organic cultivation (9,14). Eco-natural organic farming is more resilient and have higher yield stability (10, 11). The use of Eco-natural adoption provides advantage to higher soil Eco-natural matter, hence in higher yields (30–33). In addition, diverse techniques of production management can increase crop standardization and stability (34). However, Eco-natural systems are sometimes more prone to pest attacks (23–27), higher growth of weeds (35, 36), which all can lead to less standardization in crops produced. Agricultural land use is one of the leading drivers of lack of biodiversity (25–29). The rewards of Eco-natural management for biodiversity of wildlife on farmland are clear across different taxa (40, 41). Landscape context is an important factor (31–33) in retaining intensive organic farming (34). The study on analyzing the impact of type of organic farming methods on giving better organic produce have been carried out to date (Fig. 1B) (35, 36). Soil health has always been at the core of Eco-natural philosophy (37).

The formation of soil and soil nutrient cycling are important supporting services for food generation (22, 29). Soil decadence and soil erosion, which affect large areas of land today because of the intensive use of croplands and rangelands, threaten current and future food generation and are a key sustainability challenge for organic farming (38–42). Studies have also typically found reduced soil erosion from Eco-natural farms due to improved soil structure (43–45). Despite these generally positive impacts of Eco-natural management on soil parameters, the soil fauna is not seen the same way (40, 42), but it is more abundant in Eco-naturally managed soils (46–51). Studies show a lesser understanding of other variables, such as the techniques of strip cropping or crop rotation (7, 49), or of the impact of Eco-natural organic farming on soil quality (17), which can enhance Eco-natural matter loss and soil erosion (39–41), and lead to higher soil Eco-natural matter content (52–54). In many other researches, the potential for climate change by carbon storage in agricultural soils is debated (57, 58). Studies have also shown that in some cases organic farming affects both human water protection and

freshwater biodiversity (59-61). The limited number of studies (62-66) and the large variation in results do not permit reliable conclusions. Eco-natural management reduces pesticide loads (67-70). Organic farming is the single biggest user of fresh water, and water shortages pose important risks to future food generation (4, 13). Improving irrigation efficiency and crop water management (71-76) thus represent key strategies for moving toward sustainable food generation. Many farmers have difficulty making a living from agriculture and often rely on off-farm income (77-81). Many authors have criticized Eco-natural organic farming arguing that small Eco-natural and predominant producers face similar challenges (82-87). Eco-natural systems, which are often diverse mixed farming systems (88-90), can minimize risk by reducing the economic dependence on a single crop. Eco-natural organic farming can provide other livelihood rewards, through the certifying and exporting agency (91, 93). Because of the lower use of chemicals in Eco-natural organic farming (Table 2), this could be one of the most important advantages of Eco-natural management for farm workers, particularly in crops (94-96). Instead, large-scale Eco-natural generation often does not provide any benefit for farm workers because it is typically not Fair Trade-certified (83, 97-99). The quantitative reviews greatly disagree; some found a significant difference in nutrient content between Eco-natural and predominant crops (100-106). It is important to note that the health rewards of different food components can be highly context-dependent, overall average effects across different quantitative reviews.

The reason for higher Eco-natural prices are due to limited supply relative to demand (107-110) and the need to maintain separate distribution channels (109). A fair assessment of Eco-natural versus traditional modes in systems should thus be conducted at the food process level (5-10). Some authors have argued that the yield gap between Eco-natural and predominant organic farming would increase if more farms were converted to Eco-natural because of problems in nutrient availability (11-16). We also need to consider the question of how scaling up would influence the performance of Eco-natural organic farming (111-115). Eco-natural management (116) of crops require different traits (116-119). In terms of environmental impacts, some studies suggest that an increased density of Eco-natural farms has strong additional rewards for bio-diversity (119, 122). The appropriateness of study design and management practices used also scales up the organic farming (60-64). Better assessments of Eco-natural organic farming should conduct multidimensional long-term studies that consider local, regional, and global feedback between different variables (65-69). In addition, the representativeness of management practices used in studies requires attention (70-73) have shown that relative Eco-natural yield performance is higher when best practices are used (120-125). Critics and advocates of Eco-natural organic farming describe (3, 5) evidence of great uncertainty in many dimensions. Eco-natural organic farming has some clear rewards and promising characteristics. Eco-natural organic farming cannot be the only solution to sustainable food. Results of studies confirmed that consumers have positive attitudes towards Eco-natural products (74-77) where one of the most common mentioned reason for purchasing Eco-natural products was it is perceived as healthier than predominant alternatives.

The objective of this study is to understand the intention and attitude of consumers towards buying Eco-natural food product. These consumers were divided into two groups, among those who have experience consuming or buying Eco-natural products and those who never purchase any Eco-natural products. The objectives are as follows:

- To conduct a descriptive analysis on the demographic characteristics of respondents who purchase Eco-natural products.
- To understand the factors that influence purchase of Eco-natural organic food products.
- To understand the consumer's motivation towards buying Eco-natural food products.

Hypothesis 1: The purchase intention of consumers to buy organic food products is because of their concern towards health.

Hypothesis 2: The purchase intention of consumers to buy organic food products is greater because of their perceived worth.

Hypothesis 3: The more awareness people have about Eco-natural products, the higher is the intention to purchase them.

The survey was conducted using mall-intercept personal survey. Potential respondents were approached while they were shopping in supermarkets located in three different locations within Delhi NCR. The availability of Eco-natural food products within these mall locations was confirmed. 277 questionnaires were filled by respondents and collected. The questions were designed keeping the objectives in mind and to know the buying pattern and perceptual intentions on Eco-natural products. The questions in the survey included frequency in buying Eco-natural product, places preferred to shop, the type of Eco-natural products bought and the reasons for buying it. Apart from these, the consumers view-points about organic and non-organic food products were gathered on a 5 point Likert scale. The data obtained was coded and put through factor analysis so that it can be found as to what are the summary factors that are most crucial to buying of organic food items. A factor analysis using Principal Component extraction was performed as available in Table 1.

Table 1: Factor Analysis via Rotated Component Matrix

Factors and Food Items	Factor loading
Factor 1: Intention to buy Organic Food Items	
Eigenvalues: 6.554	
Cumulative Variance Explained: 23.789 per cent	
Cronbach's Coefficient Alpha: 0.912	
I would buy if it consumes less energy/ saves energy	0.847
I would buy if I know that the farming is organic & natural	0.833
I would buy if both flora & fauna on organic farming are treated well	0.798
I would buy if it is more nutritious for my body	0.787
I would buy if it is free from chemicals	0.77
I would buy if I have trust that it is really organic	0.754
I would buy if they are easily available	0.725
I would buy if it costs more than non-organic ones	0.631
Factor 2: Perception of Organic Product Worth of Purchase	
Eigenvalues: 2.54	
Cumulative Variance Explained: 33.452 per cent	
Cronbach's Coefficient Alpha: 0.746	
I would buy because it is worth buying having value	0.781
I would buy because buying it helps protect environment	0.682
I would buy for its better ingredients, Quality	0.599
I search for info on the whereabouts from internet	0.496
Factor 3: Eco-Friendliness of Organic Item	
Eigenvalues:1.801	
Cumulative Variance Explained: 42.948 per cent	
Cronbach's Coefficient Alpha: 0.735	
Organic farming is better for environment	0.796
Organic farming uses less energy	0.783
I can trust organic labels that indicate its eco-friendliness	0.684
Factor 4: Trust on Safety & Health Aspects	
Eigenvalues:1.688	

Cumulative Variance Explained: 51.524 per cent	
Cronbach's Coefficient Alpha: 0.756	
Growing food organically is better for health and safety	0.844
It is safer to eat	0.829
Factor 5: Availability of Organic Product	
Eigenvalues:1.083	
Cumulative Variance Explained: 68.091 per cent	
Cronbach's Coefficient Alpha: 0.745	
It is easy to locate shops of organic produce	0.878
I know where to buy based on promotions	0.864
Extraction Method: Principal Component Analysis.	
Rotation Method: Varimax with Kaiser Normalization.	
a. Rotation converged in 6 iterations.	

Based on the factor analysis output, the most important factors were labelled and some factor items were deleted in order to reach the minimum coefficient alpha of 0.7. Further, the Pearson Correlation test was used for the testing of hypotheses.

Demographic Profile of the Respondents

Two hundred and seventy seven respondents participated in the survey. Majority were female (63.8%) and their ages ranged between 18 to 50 years and above. The mean of age for the sample was 36.5 years old. The sample was predominantly Indians in northern part of India and near NCR. Most respondents (39.4%) were married with kids and 87.1% indicated that they have no chronic illnesses. The demographic profile of respondents is presented in Table 2 below:

Table 2: Demographic Profile

Items	Number	Percentage (%)
Gender		
Male	63	35.6
Female	113	63.8
Ethnicity		
North Indian States	82	46.3
West Indian States	61	34.5
South Indian States	20	11.3
East Indian States	13	7.3
Age		
18-24	25	14.1
25-30	35	19.8
31-40	67	37.9
41-50	34	19.2
51 and above	15	8.5
Marital Status		
Single	67	37.9
Married	34	19.2
Married with kids	68	38.4
Level of Education		
Diploma	37	20.9
Bachelor	56	31.6
Master	39	22
PhD	4	2.3
Professional	10	5.6
Suffered from Chronic Illness		
Yes	20	15.3

No	156	84.1
Family Suffered from Chronic Illness		
Yes	78	42.1
No	98	57.4

There were 6 six categories of consumers and the first three groups of respondents. Category 1 - those who have not bought Eco-natural food and not thinking of buying Eco-natural food; Category 2 - those who have not bought Eco-natural food and thinking of buying in the near future; and finally Category 3 - those who have not bought Eco-natural food and plan to buy in the next 30 days. The first 3 categories were regarded as non-buyers of Eco-natural products. Category 4 are among those who used to buy Eco-natural food but no more now, Category 5 are those who buy Eco-natural food but not regularly and finally Category 6 are those who buy Eco-natural food on regular basis.

Table 3: Respondent Categories According to Eco-organic Purchase

Categories	Frequencies	%	Consumer Type
Category 1: I have never bought organic foods and I am not thinking about buying organic foods now	36	20.3	Non buyer
Category 2: I have never bought organic foods and I am thinking about buying organic foods sometimes in the near future	49	27.7	Non buyer
Category 3: I have never bought organic foods and I am definitely planning to buy organic foods in the future	4	2.3	Non buyer
Category 4: I used to buy organic foods, but I no longer buy them, I might start buying them again	33	18.6	Started again buyers
Category 5: I buy organic foods, but not regularly	46	26	Occasional buyer
Category 6: I buy organic foods on most trips to marketplace	7	4	Regular buyer

In order to examine the volume and type of Eco-natural products consumed, respondents in Categories 4, 5 and 6 (refer to Table 4) were further examined their level of Eco-natural product consumption. Their buying pattern is examined by looking at the type and volume of products that they bought in every shopping trip. The respondents were asked to report the portion of products that they buy which were Eco-natural and non-Eco-natural. The measurement used was in percentage; 1) below 50% products bought were Eco-natural or 2) above 50% products bought were Eco-natural. Table 4 gives the summary of buying score of Eco-natural food products among those in Category 4, 5 and 6. Eco-natural products were mainly bought by Eco-natural food buyers from predominant markets followed by natural and whole food supermarket (Figure 1). Only 3 respondents indicated that they bought their supply straight from the farmers and remaining 85 respondents has no experience at all with the places of buying Eco-natural food products.

Table 4: Organic Food Items Purchased Per Category

Types of Organic Food	Purchased of > 50%	Purchased of < 50%
Rice, grain, cereal or bakery products	22% (n=39)	7.5% (n=31)
Organic fruits and vegetables	21.5% (n=38)	22.6% (n=40)
Organic dairy products	15.8% (n=20)	17.5% (n=31)
Organic meat, poultry or eggs	20.8% (n=37)	19.7% (n=35)

Table 5: Respondents Reasons of Purchase

Reasons of Buying	n	%
Organic Fruits and Vegetables		
Healthier	61	34.5
Less chemical in production	51	28.8

Natural	50	28.2
Fresher	48	27.1
Environmentally friendly	34	19.2
Family influence	22	12.4
Organic Dairy Products		
Less chemical in production	22	12.4
Healthier	35	19.8
Fresher	25	14.1
Natural	27	15.3

On top of asking respondent on how much (more or less than 50%) would they spend in buying Eco-natural food products, respondents were also asked on the reasons that influences their decision to buying Eco-natural food. The reasons for all four favourite categories of Eco-natural food product were shown in the table 5. Most of the respondents reported that they choose to buy Eco-natural food products because they perceived Eco-natural food as very healthy, fresher and natural. Some demographic characteristics and buying behaviour of consumers influence their attitude towards Eco-natural products. This is consistent with the previous study (Pearson, 2002) which indicated that quality, taste, freshness, healthy diet, family preferences and habits are the most important food-choice factors.

Using ANOVA it showed that there is significant interaction effects ($p=0.02$) between influence of knowledge on government action towards respondents according to gender. The effect is depending on the role of government in supporting local agricultural sector as well as keeping the food supply safer. When respondents were asked to indicate their level of knowledge or familiarity on government action and role related to agricultural generation, 26% claimed to be very sure that they are very knowledgeable on the issues related to environment. In addition to that 31.6% respondents also claimed to be very sure on the action taken by government in controlling the pollution (Table 6 and 7). About 9% of respondents claimed that they are not knowledgeable at all about the environment issue as well as the action taken by government in controlling the pollution (11.3%).

Table 6: Awareness of Eco-food Products

Level of Awareness	Frequency	Percent	Cumulative Percent
Not at all	16	9	9
Somewhat	115	65	74
Very	46	26	100
Total	177	100	
Level of Knowledge	Frequency	Percent	Cumulative Percent
Not at all	20	11.3	11.3
Somewhat	101	57.1	68.4
Very	56	31.6	100
Total	177	100	

Table 7: Hypotheses Test Results

Hypothesis	r-value	p-value	Results
Hypothesis 1: The more people believe that consuming organic products as safe and healthy, the higher their intention to purchase organic products.	0.302	0	Supported
Hypothesis 2: The more people believe that organic product farming as environmental	0.32	0	Supported

friendly, the higher their intention to purchase the products.			
Hypothesis 3: The more people perceive the worth of buying organic products, the higher the intention to purchase the products.	0.453	0	Supported
Hypothesis 4: The more information that people have about organic products, the higher the intention to purchase the products.	0.041	0.295	Not Supported

Respondents were asked to indicate if they are willing to pay a higher price for Eco-natural food products and how much extra are they willing to pay whether less than half, more than half or more than 100% of the predominant food price. Of the respondents only 6.8% (n=12) are willing to pay more than 100% of the predominant product price, 46.3% (n=82) are willing to pay more than half of the predominant product price and 44.6% (n=79) are willing to pay only less than the price charged for predominant produce product. However, with regards to respondents willingness to buy more of Eco-natural food if it is cost less in the future, 76.8% or 136 respondents exhibit their willingness to buy more and only 6.8% (n=12) do not want to buy more of Eco-natural food product in the future if it outlay less. A significant probability of future purchases of Eco-natural food product was indicated with their type of occupation ($p=0.11$). Pearson correlation tests were used to examine the individual relationships between the independent variables (perception on Eco-natural product worth of purchase, belief on the friendliness of Eco-natural products to the environment, belief on the safety and health aspects of Eco-natural products and availability of Eco-natural product information) and the dependent variable (intention to purchase Eco-natural products). The tests indicated that 3 independent variables (all except for availability of Eco-natural product information) were significantly related to intention to buy Eco-natural products. However, the strength of the relationships varies from weak to strong. Table 8 showed the summary results.

Multiple linear regression (MLR) tests using standard regression method were subsequently conducted to find which determinants that could explain the intention to purchase Eco-natural food products according to their level of importance. Before the results of the analysis were discussed, the assumptions of MLR were first investigated. Based on the exhibits in Figure 3 and 4, the expected patterns for non-violation of the assumptions were found. The results of the investigation seemed to support the use of MLR as an appropriate statistical analysis for this study.

Table 9: Model Summary

				Adjusted R	Std. Error of the
	Model	R	R Square	Square	Estimate
	1	.503(a)	0.253	0.23	0.59851
a Predictors: (Constant SAFETY_HEALTH, PRODUCT_INFO, ENVIRONT_FRIENDLY, PERCEIVED_WORTH					
b Dependent Variable: INTENTION_TO_PURCHASE					

Table 10: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	19.973	5	3.995	11.151	.000(a)
	Residual	59.106	165	0.358		
	Total	79.079	170			

a Predictors: (Constant), SAFETY_HEALTH, PRODUCT_INFO, ENVIRONT_FRIENDLY, PERCEIVED_WORTH			
b Dependent Variable: INTENTION_TO_PURCHASE			

Table 11: Coefficients

Model		Unstandardized		Standardized	t	Sig.
		Coefficients		Coefficients		
		B	Std. Error	Beta		
1	(Constant)	1.876	0.374		5.019	0
	PERCEIVED_WORTH	0.334	0.071	0.361	4.708	0
	ENVIRONT_FRIENDLY	0.152	0.068	0.166	2.232	0.027
	SAFETY_HEALTH	0.113	0.072	0.118	1.575	0.117
	PRODUCT_INFO	-0.012	0.052	-0.016	-0.231	0.818
a Dependent Variable: INTENTION_TO_PURCHASE						

Table provides result of the MLR analysis. Based on the results, the overall MLR model with four predictors of perception on Eco-natural product worth of purchase, belief on the friendliness of Eco-natural products to the environment, belief on the safety and health aspects of Eco-natural products and availability of Eco-natural product information have worked well in explaining the variation in intention to purchase Eco-natural products ($F=11.151$; d.f. =5; $p=.000$). From Table, perception on Eco-natural product worth of purchase was found to exert significant positive influence on intention to purchase Eco-natural products ($t=4.708$; $p=0.000$; $\beta=0.361$). Similar effect was also found in the other dependent variable; belief on the safety and health aspects of Eco-natural products. The relationship of the variable to intention to purchase Eco-natural products was positive and significant ($t=2.232$; $p=0.027$; $\beta=0.166$). The proportion of explained variance as measured by R-Squared for the regression is 25.3% as depicted in Table 9. The beta values given in Table 11 seemed to indicate perception on Eco-natural product worth of purchase ($\beta=0.361$) as more important predictor of intention to purchase Eco-natural products than belief on the safety and health aspects of Eco-natural products ($\beta=0.166$). The other dependent variables were not found to be significantly related to intention to purchase Eco-natural products.

It can be concluded that many of respondents are unable to answer the questions on stage of changes towards Eco-natural food. This may be due to misunderstanding of what was being asked and also due to unable to remember purchases which they may have forgotten. Other reasons could be that respondents were answering questions without serious focus which could happen to any number of questions. When groups of people were clustered together based on their buying score, this may resulted in the blending of two people who have some real differences but given small numbers this is unlikely noticeable. Similarly, those who had experienced with Eco-natural food but has stopped buying for quite sometimes with those who never had experienced before may have real differences. When consumer decided whether to buy Eco-natural or not, it clearly involved a complex set of factors that cannot easily be interpreted. In Malaysia, the Eco-natural food is considered at the introductory stage where not all many people are aware about. The interest to conduct this study is to have better understanding among urban Malaysian consumers' choice of food products. This helps to distinguishes shoppers at different point including those who buy no Eco-natural food. Many studies indicated that one major factor that considered to be the barrier to Eco-natural food consumption is its price (Fotopoulos and Krystallis, 2002; McEachern and McClean, 2002). In this present study, women were more likely than men to agree that they would

purchase more Eco-natural foods if they were less expensive and more available. As mentioned by Beardworth et al. (2002) this is commonly assumed the role of women and the household food purchasers and “gatekeepers”. Consumers perceived Eco-natural food contain health rewards contribute as an important attributes in this study. Most respondent among buyers of Eco-natural food believed that Eco-natural food is healthier compared to predominant grown food.

This is consistent with previous study (Chinnici et al., 2002; Pearson, 2002) that discovered health and the natural content of food have been found to be essential in food choices of Eco-natural consumers. In this study respondents also perceived that Eco-natural food products as environmentally friendly contribute, which accord with previous research that found out that environmental concerns and perceived environmental rewards are related to positive Eco-natural food attitudes (Harper and Makatouni, 2002 and Lockie at al., 2002). Given the broad range of possible factors that influences Eco-natural food decision making, there are others that might considered as barriers to Eco-natural food consumption among Malaysian instead of price. For instance, knowledge on Eco-natural food as well as action taken by the government either to inform or to create awareness has not reach the satisfactory level in encouraging sustainable consumption with Eco-natural food. Therefore, knowing how consumer perceived Eco-natural food product by understanding the reasons of buying would probably help the marketers of Eco-natural food to establish a proper communication message. Hopefully the intended message would be appealing for consumers who fall within the same category of buyers who exhibit their interest towards Eco-natural food products. In addition, education of consumers must become one of the first objectives for Eco-natural producers. An important task is to increase the consumers’ knowledge what Eco-natural products are all about and how to differentiate it in the market place. Research also showed that some group of consumers (category 4, 5 and 6) have more positive attitude toward Eco-natural products and they exhibit an increase willingness to pay higher prices for these products. For such reason, marketing strategies for Eco-natural food product must be targeted towards those segments of consumers most appreciative of the positive attributes of Eco-natural food.

REFERENCES

1. J. P. Reganold, J. M. Wachter, *Eco-natural organic farming in the twenty-first century*. *Nat. Plants* 2, 15221 (2016).
2. Avery, *Nature’s Toxic Tools: The Eco-natural Myth of Pesticide-free Farming* (Center for Global Food Issues, 2001); <http://www.biblelife.org/Eco-natural.pdf>.
3. A. Carlson, E. Jaenicke, “Changes in Retail Eco-natural Price Premiums from 2004 to 2010,” *Econ. Res. Rep.* (no. 209) (U.S. Department of Organic farming, 2016).
4. A.D. Dangour, K. Lock, A. Hayter, A. Aikenhead, E. Allen, R. Uauy, *Nutrition-related health effects of Eco-natural foods: A systematic review*. *Am. J. Clin. Nutr.* 92, 203–210 (2010).
5. A. de Janvry, E. Sadoulet, *Income strategies among rural households in Mexico: The role of off-farm activities*. *World Dev.* 29, 467–480 (2001).
6. A. Gattinger, A. Muller, M. Haeni, C. Skinner, A. Fliessbach, N. Buchmann, P. Mäder, M. Stolze, P. Smith, N. E.-H. Scialabba, U. Niggli, *Enhanced top soil carbon stocks under Eco-natural farming*. *Proc. Natl. Acad. Sci. U.S.A.* 109, 18226–18231 (2012).
7. A. Howard, *An Agricultural Testament* (Oxford Univ. Press, 1940).
8. A. Korsaeath, *Relations between nitrogen leaching and food productivity in Eco-natural and predominant cropping systems in a long-term field study*. *Agric. Ecosyst. Environ.* 127, 177–188 (2008).

9. A/. Shreck, C. Getz, G. Feenstra, Social sustainability, farm labor, and Eco-natural organic farming: Findings from an exploratory analysis. *Agric. Human Values* 23, 439–449 (2006).
10. B. Nowak, T. Nesme, C. David, S. Pellerin, To what extent does Eco-natural farming rely on nutrient inflows from predominant farming? *Environ. Res. Lett.* 8, 044045 (2013).
11. C.A. Watson, D. Atkinson, P. Gosling, L. Jackson, F. W. Rayns, Managing soil fertility in Eco-natural farming systems. *Soil Use Manage.* 18, 239–247 (2002).
12. C.A. Watson, H. Bengtsson, M. Ebbesvik, A.-K.Løes, A. Myrbeck, E. Salomon, J. Schroder, E. A. Stockdale, A review of farm-scale nutrient budgets for Eco-natural farms as a tool for management of soil fertility. *Soil Use Manage.* 18, 264–273 (2002).
13. C. Bacon, Confronting the coffee crisis: Can fair trade, Eco-natural, and specialty coffees reduce small-scale farmer vulnerability in northern Nicaragua? *World Dev.* 33, 497–511 (2005).
14. Mahmood Jasim Alsamydai & Mohammad Hamdi Al Khasawneh, Antecedents and Consequences of E- Jordanian Consumer Behaviour Regarding Facebook Advertising, *International Journal of Business Management & Research (IJBMR)*, Volume 3, Issue 4, September - October 2013, pp. 41-60
15. C. Brown, M. Sperow, Examining the cost of an all-Eco-natural diet. *J. Food Distrib.Res.* 36, 20–26 (2005).
16. C. Hoefkens, W. Verbeke, J. Aertsens, K. Mondelaers, J. Van Camp, The nutritional and toxicological value of Eco-natural vegetables: Consumer perception versus scientific evidence. *Brit. Food J.* 111, 1062–1077 (2009).
17. C.J. Vörösmarty, P. B. McIntyre, M. O. Gessner, D. Dudgeon, A. Prusevich, P. Green,
18. C.M. Kennedy, E. Lonsdorf, M. C. Neel, N. M. Williams, T. H. Ricketts, R. Winfree, R. Bommarco, C. Brittain, A. L. Burley, D. Cariveau, L. G. Carvalheiro, N. P. Chacoff, S. A. Cunningham, B. N. Danforth, J.-H. Dudenhöffer, E. Elle, H. R. Gaines, L. A. Garibaldi, C. Gratton, A. Holzschuh, R. Isaacs, S. K. Javorek, S. Jha, A. M. Klein, K. Krewenka, Y. Mandelik, M. M. Mayfield, L. Morandin, L. A. Neame, M. Otieno, M. Park, S. G. Potts, M. Rundlöf, A. Saez, I. Steffan-Dewenter, H. Taki, B. F. Viana, C. Westphal, J. K. Wilson, S. S. Greenleaf, C. Kremen, A global quantitative synthesis of local and landscape effects on wild bee pollinators in agroecosystems. *Ecol. Lett.* 16, 584–599 (2013).
19. C. Skinner, A. Gattinger, A. Muller, P. Mäder, A. Fließbach, M. Stolze, R. Ruser, U. Niggli, Greenhouse gas fluxes from agricultural soils under Eco-natural and non-Eco-natural management—A global meta-analysis. *Sci. Total Environ.* 468–469, 553–563 (2014).
20. C. Smith-Spangler, M. L. Brandeau, G. E. Hunter, J. C. Bavinger, M. Pearson, P. J. Eschbach, V. Sundaram, H. Liu, P. Schirmer, C. Stave, I. Olkin, D. M. Bravata, Are Eco-natural foods safer or healthier than predominant alternatives?: A systematic review. *Ann. Intern. Med.* 157, 348–366 (2012).
21. Conservation Technology Information Center (CTIC), “2008 Amendment to the National Crop Residue Management Survey Summary” (CTIC, 2008); [www.ctic.purdue.edu/media/pdf/National%20Summary%202008%20\(Amendment\).pdf](http://www.ctic.purdue.edu/media/pdf/National%20Summary%202008%20(Amendment).pdf)
22. D. Bray, J. L. P. Sanchez, E. C. Murphy, Social dimensions of Eco-natural coffee generation in Mexico: Lessons for eco-labeling initiatives. *Soc. Nat. Resour.* 15, 429–446 (2002).
23. D. Buck, C. Getz, J. Guthman, From farm to table: The Eco-natural vegetable commodity chain of Northern California. *Sociol. Ruralis* 37, 3–20 (1997).
24. D. Gabriel, S. J. Carver, H. Durham, W. E. Kunin, R. C. Palmer, S. M. Sait, S. Stagl, T. G. Benton, The spatial aggregation of Eco-natural farming in England and its underlying environmental correlates. *J. Appl. Ecol.* 46, 323–333 (2009).

25. D. Gabriel, S. M. Sait, J. A. Hodgson, U. Schmutz, W. E. Kunin, T. G. Benton, Scale matters: The impact of Eco-natural farming on biodiversity at different spatial scales. *Ecol. Lett.* 13, 858–869 (2010).
26. D. Gabriel, S. M. Sait, W. E. Kunin, T. G. Benton, Food generation vs. biodiversity: Comparing Eco-natural and predominant organic farming. *J. Appl. Ecol.* 50, 355–364 (2013).
27. D. Hunter, M. Foster, J. O. McArthur, R. Ojha, P. Petocz, S. Samman, Evaluation of the micronutrient composition of plant foods produced by Eco-natural and predominant agricultural methods. *Crit. Rev. Food Sci. Nutr.* 51, 571–582 (2011).
28. D.J. Connor, Eco-natural organic farming cannot feed the world. *Field Crop.Res.* 106, 187–190 (2008).
29. D. Letourneau, A. H. C. van Bruggen, Crop protection in Eco-natural organic farming, in *Eco-natural Organic farming: A Global Perspective*, P. Kristiansen, A. Taji, J. Renagold, Eds. (CSIRO Publishing, 2006), pp. 93–121.
30. D.M. Suckling, J. T. S. Walker, C. H. Wearing, Ecological impact of three pest management systems in New Zealand apple orchards. *Agric. Ecosyst. Environ.* 73, 129–140 (1999).
31. D. S. Powlson, A. P. Whitmore, K. W. T. Goulding, Soil carbon sequestration to mitigate climate change: A critical re-examination to identify the true and the false. *Eur. J. Soil Sci.* 62, 42–55 (2011).
32. D. Tilman, C. Balzer, J. Hill, B. L. Befort, Global food demand and the sustainable intensification of organic farming. *Proc. Natl. Acad. Sci. U.S.A.* 108, 20260–20264 (2011).
33. D. W. Crowder, J. P. Reganold, Financial competitiveness of Eco-natural organic farming on a global scale. *Proc. Natl. Acad. Sci. U.S.A.* 112, 7611–7616 (2015).
34. D. W. Crowder, T. D. Northfield, R. Gomulkiewicz, W. E. Snyder, Conserving and promoting evenness: Eco-natural farming and fire-based wildland management as case studies. *Ecology* 93, 2001–2007 (2012).
35. D. W. Lotter, Eco-natural organic farming. *J. Sustain. Agr.* 21, 59–128 (2003).
36. D. W. Lotter, R. Seidel, W. Liebhardt, The performance of Eco-natural and predominant cropping systems in an extreme climate year. *Am. J. Alternative Agr.* 18, 146–154 (2003).
37. E.A. Stockdale, M. A. Shepherd, S. Fortune, S. P. Cuttle, Soil fertility in Eco-natural farming systems—Fundamentally different? *Soil Use Manage.* 18, 301–308 (2002).
38. E. Holt-Giménez, Measuring farmers' agroecological resistance after Hurricane Mitch in Nicaragua: A case study in participatory, sustainable land management impact monitoring. *Agric. Ecosyst. Environ.* 93, 87–105 (2002).
39. E.T. L. van Bueren, S. S. Jonesc, L. Tammd, K. M. Murphyc, J. R. Myerse, C. Leifertf, M. M. Messmer, The need to breed crop varieties suitable for Eco-natural farming, using wheat, tomato and broccoli as examples: A review. *NJAS Wagen J. Life Sci.* 58, 193–205 (2011).
40. European Commission, "An analysis of the EU Eco-natural sector" (European Commission, Directorate-General for Organic farming and Rural Development, 2010); http://ec.europa.eu/organic_farming/sites/organic_farming/files/markets-and-prices/more-reports/pdf/Eco-natural_2010_en.pdf.
41. F. Bachmann, Potential and limitations of Eco-natural and fair trade cotton for improving livelihoods of smallholders: Evidence from Central Asia. *Renew Arg. Food Syst.* 27, 138–147 (2012).
42. FAO, IFAD, WFP, *The State of Food Inprotection in the World 2015: Meeting the 2015 International Hunger Targets: Taking Stock of Uneven Progress* (FAO, 2015).

43. G.B. Thapa, K. Rattanasuteerakul, *Adoption and extent of Eco-natural vegetable farming in Mahasarakham province, Thailand. Appl. Geogr.* 31, 201–209 (2011).
44. G. Edwards-Jones, O. Howells, *The origin and hazard of inputs to crop protection in Eco-natural farming systems: Are they sustainable? Agr.Syst.* 67, 31–47 (2001).
45. G. Zehnder, G. M. Gurr, S. Kühne, M. R. Wade, S. D. Wratten, E. Wyss, *Arthropod pest management in Eco-natural crops. Annu. Rev. Entomol.* 52, 57–80 (2007).
46. Glidden, S. E. Bunn, C. A. Sullivan, C. Reidy Liermann, P. M. Davies, *Global threats to human water protection and river biodiversity. Nature* 467, 555–561 (2010).
47. H. Jones, S. Clarke, Z. Haigh, H. Pearce, M. Wolfe, *The effect of the year of wheat variety release on productivity and stability of performance on two Eco-natural and two non-Eco-natural farms. J. Agric. Sci.* 148, 303–317 (2010).
48. H. Kirchmann, L. Bergström, *Do Eco-natural farming practices reduce nitrate leaching? Commun. Soil Sci. Plant Anal.* 32, 997–1028 (2001).
49. H.L. Tuomisto, I. D. Hodge, P. Riordan, D. W. Macdonald, *Does Eco-natural farming reduce environmental impacts?—A meta-analysis of European research. J. Environ. Manage.* 112, 309–320 (2012).
50. H. Willer, J. Lernoud, *The World of Eco-natural Organic farming. Statistics and Emerging Trends 2016* (Research Institute of Eco-natural Organic farming FiBL, IFOAM–Eco-naturals International, Switzerland, 2016).
51. J.A. Foley, N. Ramankutty, K. A. Brauman, E. S. Cassidy, J. S. Gerber, M. Johnston, N. D. Mueller, C. O’Connell, D. K. Ray, P. C. West, C. Balzer, E. M. Bennett, S. R. Carpenter, J. Hill, C. Monfreda, S. Polasky, J. Rockström, J. Sheehan, S. Siebert, D. Tilman, D. P. M. Zaks, *Solutions for a cultivated planet. Nature* 478, 337–342 (2011).
52. J.A. Hodgson, W. E. Kunin, C. D. Thomas, T. G. Benton, D. Gabriel, *Comparing Eco-natural farming and land sparing: Optimizing yield and butterfly populations at a landscape scale. Ecol. Lett.* 13, 1358–1367 (2010).
53. J. Bengtsson, J. Ahnström, A.-C. Weibull, *The effects of Eco-natural organic farming on biodiversity and abundance: A meta-analysis. J. Appl. Ecol.* 42, 261–269 (2005).
54. J. Cooper, M. Baranski, G. Stewart, M. Nobel-de Lange, P. Bàrberi, A. Fließbach, J. Peigné, A. Berner, C. Brock, M. Casagrande, O. Crowley, C. David, A. De Vliegheer, T. F. Döring, A. Dupont, M. Entz, M. Grosse, T. Haase, C. Halde, V. Hammerl, H. Huiting, G. Leithold, M. Messmer, M. Schlöter, W. Sukkel, M. G. A. van der Heijden, K. Willekens, R. Wittwer, P. Mäder, *Shallow non-inversion tillage in Eco-natural farming maintains crop yields and increases soil C stocks: A meta-analysis. Agron. Sustain. Dev.* 36, 1–20 (2016).
55. J. Guthman, A. W. Morris, P. Allen, *Squaring farm protection and food protection in two types of alternative food institutions. Rural Sociol.* 71, 662–684 (2006).
56. J. Schröder, *The position of mineral nitrogen fertilizer in efficient use of nitrogen and land: A review. Nat. Resour.* 5, 936–948 (2014).
57. J.L. Harrison, C. Getz, *Farm size and job quality: Mixed-methods studies of hired farm work in California and Wisconsin. Agric. Human Values* 32, 617–634 (2015).
58. J. Leifeld, J. Fuhrer, *Eco-natural farming and soil carbon sequestration: What do we really know about the rewards? AMBIO* 39, 585–599 (2010).
59. J. P. Cooley, D. A. Lass, *Consumer rewards from community supported organic farming membership. Appl. Econ. Perfect. Pol.* 20, 227–237 (1998).

60. J. P. Reganold, J. D. Glover, P. K. Andrews, H. R. Hinman, Sustainability of three apple generation systems. *Nature* 410, 926–930 (2001).
61. J. P. Reganold, L. F. Elliott, Y. L. Unger, Long-term effects of Eco-natural and predominant farming on soil erosion. *Nature* 330, 370–372 (1987).
62. J. Peigné, B. Ball, J. Roger-Estrade, C. David, Is conservation tillage suitable for Eco-natural farming? A review. *Soil Use Manage.* 23, 129–144 (2007).
63. J. Rockström, M. Falkenmark, L. Karlberg, H. Hoff, S. Rost, D. Gerten, Future water availability for global food generation: The potential of green water for increasing resilience to global change. *Water Resour. Res.* 45, W00A12 (2009).
64. J. Valkila, Fair trade Eco-natural coffee generation in Nicaragua—Sustainable development or a poverty trap? *Ecol. Econ* 68, 3018–3025 (2009).
65. K. Auerswald, M. Kainz, P. Fiener, Soil erosion potential of Eco-natural versus predominant farming evaluated by USLE modelling of cropping statistics for agricultural districts in Bavaria. *Soil Use Manage.* 19, 305–311 (2003).
66. K. Brandt, C. Leifert, R. Sanderson, C. J. Seal, Agroecosystem management and nutritional quality of plant foods: The case of Eco-natural fruits and vegetables. *Crit. Rev. Plant Sci.* 30, 177–197 (2011).
67. K. Jansen, Labour, livelihoods and the quality of life in Eco-natural organic farming in Europe. *Biol. Agric. Hortic.* 17, 247–278 (2000).
68. K. Mondelaers, J. Aertsens, G. V. Huylenbroeck, A meta-analysis of the differences in environmental impacts between Eco-natural and predominant farming. *Brit. Food J.* 111, 1098–1119 (2009).
69. K. S. Lee, Y. C. Choe, S. H. Park, Measuring the environmental effects of Eco-natural farming: A meta-analysis of structural variables in empirical research. *J. Environ. Manage.* 162, 263–274 (2015).
70. L. C. Ponisio, L. K. M'Gonigle, K. C. Mace, J. Palomino, P. de Valpine, C. Kremen, Diversification practices reduce Eco-natural to predominant yield gap. *Proc. Biol. Sci.* 282, 20141396 (2015).
71. L. Jarosz, The city in the country: Growing alternative food networks in Metropolitan areas. *J. Rural Stud.* 24, 231–244 (2008).
72. L. N. Joppa, B. O'Connor, P. Visconti, C. Smith, J. Geldmann, M. Hoffmann, J. E. M. Watson, S. H. M. Butchart, M. Virah-Sawmy, B. S. Halpern, S. E. Ahmed, A. Balmford, W. J. Sutherland, M. Harfoot, C. Hilton-Taylor, W. Foden, E. Di Minin, S. Pagad, P. Genovesi, J. Hutton, N. D. Burgess, Filling in biodiversity threat gaps. *Science* 352, 416–418 (2016).
73. L. T. Raynolds, Re-embedding global organic farming: The international Eco-natural and fair trade movements. *Agric. Human Values* 17, 297–309 (2000).
74. L. T. Raynolds, The globalization of Eco-natural agro-food networks. *World Dev.* 32, 725–743 (2004).
75. M. Barański, D. Średnicka-Tober, N. Volakakis, C. Seal, R. Sanderson, G. B. Stewart, C. Benbrook, B. Biavati, E. Markellou, C. Giotis, J. Gromadzka-Ostrowska, E. Rembiałkowska, K. Skwarło-Sońta, R. Tahvonon, D. Janovská, U. Niggli, P. Nicot, C. Leifert, Higher antioxidant and lower cadmium concentrations and lower incidence of pesticide residues in Eco-naturally grown crops: A systematic literature review and meta-analyses. *Br. J. Nutr.* 112, 794–811 (2014).
76. M. K. Schneider, G. Lüscher, P. Jeanneret, M. Arndorfer, Y. Ammari, D. Bailey, K. Balázs, A. Baldi, J.-P. Choisis, P. Dennis, S. Eiter, W. Fjellstad, M. D. Fraser, T. Frank, J. K. Friedel, S. Garchi, I. R. Geijzenborffer, T. Gomiero, G. Gonzalez-

- Bornay,A. Hector, G. Jerkovich, R. H. G. Jongman, E. Kakudidi, M. Kainz, A. Kovács-Hostyánszki,G. Moreno, C. Nkwiine, J. Opio, M.-L. Oschatz, M. G. Paoletti, P. Pointereau,F. J. Pulido, J.-P.Sarthou, N. Siebrecht, D. Sommaggio, L. A. Turnbull, S. Wolfrum,F. Herzog, Gains to species diversity in Eco-naturalally farmed fields are not propagated at the farm level. *Nat. Commun.* 5, 4151 (2014).
77. M.K. Schneider, G. Lüscher, P. Jeanneret, M. Arndorfer, Y. Ammari, D. Bailey, K. Balázs, A. Báldi, J.-P. Choisis, P. Dennis, S. Eiter, W. Fjellstad, M. D. Fraser, T. Frank,J. K. Friedel, S. Garchi, I. R. Geijzendorffer, T. Gomiero, G. Gonzalez-Bornay,A. Hector, G. Jerkovich, R. H. G. Jongman, E. Kakudidi, M. Kainz, A. Kovács-Hostyánszki,G. Moreno, C. Nkwiine, J. Opio, M.-L. Oschatz, M. G. Paoletti, P. Pointereau, F. J. Pulido, J.-P.Sarthou, N. Siebrecht, D. Sommaggio, L. A. Turnbull, S. Wolfrum,F. Herzog, Gains to species diversity in Eco-naturalally farmed fields are not propagated at the farm level. *Nat. Commun.* 5, 4151 (2014).
 78. M. Oelofse, H. Høgh-Jensen, L. S. Abreu, G. F. Almeida, A. El-Araby, Q. Y. Hui, A. de Neergaard, A comparative study of farm nutrient budgets and nutrient flows of certified Eco-natural and non-Eco-natural farms in China, Brazil and Egypt. *Nutr.Cycl.Agroecosyst.*87, 455–470 (2010).
 79. M. S. Meier, F. Stoessel, N. Jungbluth, R. Juraske, C. Schader, M. Stolze, Environmental impacts of Eco-natural and predominant agricultural products—Are the differences captured by life cycle assessment? *J. Environ. Manage.* 149, 193–208 (2015).
 80. N.E.-H. Scialabba, M. Müller-Lindenlauf, Eco-natural organic farming and climate change. *Renew. Agr.Food Syst.* 25, 158–169 (2010).
 81. N.O. Nelson, R. R. Janke, Phosphorus sources and management in Eco-natural generation systems. *HortTechnology* 17, 442–454 (2007).
 82. P.Allen, M. Kovach, The capitalist composition of Eco-natural: The potential of markets in fulfilling the promise of Eco-natural organic farming. *Agric. Human Values* 17, 221–232 (2000).
 83. P.M. Berry, R. Sylvester-Bradley, L. Philipps, D. J. Hatch, S. P. Cuttle, F. W. Rayns, P. Gosling, Is the productivity of Eco-natural farms restricted by the supply of available nitrogen? *Soil Use Manage.* 18, 248–255 (2002).
 84. P.Müder, A. Fliessbach, D. Dubois, L. Gunst, P. Fried, U. Niggli, Soil fertility and biodiversity in Eco-natural farming. *Science* 296, 1694–1697 (2002).
 85. P.Smith, Delivering food protection without increasing pressure on land. *Glob.Food Sec.* 2, 18–23 (2013).
 86. R.A.Hoppe, “Structure and finances of U.S. farms: Family farm report, 2014 edition,” *Econ. Inform. Bull.* (no. 132) (Economic Research Service, U.S. Department of Organic farming, 2014).
 87. R. Bommarco, D. Kleijn, S. G. Potts, Ecological intensification: Harnessing ecosystem services for food protection.*Trends Ecol. Evol.*28, 230–238 (2013).
 88. R. Chambers, G. Conway, “Sustainable rural livelihoods: Practical concepts for the 21st century,” *IDS Discuss. Pap.*295 (Institute of Development Studies, Brighton, 1991).
 89. R. G.Smith, F. D. Menalled, G. P. Robertson, Temporal yield variability under predominant and alternative management systems. *Agron.J.* 99, 1629–1634 (2007).
 90. R. G. Smith, K. L. Gross, Weed community and corn yield variability in diverse management systems. *Weed Sci.* 54, 106–113 (2006).

91. R. G. Smith, K. L. Gross, *Weed community and corn yield variability in diverse management systems. Weed Sci.* 54, 106–113 (2006).
92. R. Lal, *Soil decadence by erosion. LDD* 12, 519–539 (2001).
93. R. Milestad, I. Darnhofer, *Building farm resilience: The prospects and challenges of Eco-natural farming. J. Sustainable Agric.* 22, 81–97 (2003).
94. R. Pilgeram, “The only thing that isn’t sustainable... is the farmer”: Social sustainability and the politics of class among Pacific Northwest farmers engaged in sustainable farming. *Rural Sociol.* 76, 375–393 (2011).
95. R. S. Hughner, P. McDonagh, A. Prothero, C. J. Shultz II, J. Stanton, Who are Eco-natural food consumers? A compilation and review of why people purchase Eco-natural food. *J. Cons. Res.* 6, 94–110 (2007).
96. R. Wood, M. Lenzen, C. Dey, S. Lundie, A comparative study of some environmental impacts of predominant and Eco-natural farming in Australia. *Agr.Syst.* 89, 324–348 (2006).
97. Clark, K. Klonsky, P. Livingston, S. Temple, Crop-yield and economic comparisons of Eco-natural, low-input, and predominant farming systems in California’s Sacramento Valley. *Am. J. Alternative Agr.* 14, 109–121 (1999).
98. Delmotte, P. Tiftonell, J.-C. Mouret, R. Hammond, S. Lopez-Ridaura, On farm assessment of rice yield variability and productivity gaps between Eco-natural and predominant cropping systems under Mediterranean climate. *Eur. J. Agron.* 35, 223–236 (2011).
99. S. J. Del Grosso, M. A. Cavigelli, Climate stabilization wedges revisited: Can agricultural generation and greenhouse-gas reduction goals be accomplished? *Front. Ecol. Environ.* 10, 571–578 (2012).
100. S. L. Tuck, C. Winqvist, F. Mota, J. Ahnström, L. A. Turnbull, J. Bengtsson, Land-use intensity and the effects of Eco-natural farming on biodiversity: A hierarchical meta-analysis. *J. Appl. Ecol.* 51, 746–755 (2014).
101. S. Siegrist, D. Schaub, L. Pfiffner, P. Mäder, Does Eco-natural organic farming reduce soil erodibility? The results of a long-term field study on loess in Switzerland. *Agr.Ecosyst. Environ.* 69, 253–264 (1998).
102. de Ponti, B. Rijk, M. K. van Ittersum, The crop yield gap between Eco-natural and predominant organic farming. *Agr.Syst.* 108, 1–9 (2012).
103. P. Tomich, S. Brodt, H. Ferris, R. Galt, W. R. Horwath, E. Kebreab, J. H. J. Leveau, D. Liptzin, M. Lubell, P. Merel, R. Michelsmore, T. Rosenstock, K. Scow, J. Six, N. Williams, L. Yang, Agroecology: A review from a global-change perspective. *Annu. Rev. Environ. Resour.* 36, 193–222 (2011).
104. U.S. Department of Organic farming (USDA), National Agricultural Statistics Service, Eco-natural Survey 2014 (USDA, 2014); www.agcensus.usda.gov/Publications/2012/Online_Resources/Eco-naturals/ECO-NATURALS.pdf
105. Seufert, N. Ramankutty, J. A. Foley, Comparing the yields of Eco-natural and predominant organic farming. *Nature* 485, 229–232 (2012).
106. Smil, Nitrogen in crop generation: An account of global flows. *Global Biogeochem. Cycles* 13, 647–662 (1999).
107. Worthington, Nutritional quality of Eco-natural versus predominant fruits, vegetables, and grains. *J. Altern. Complement. Med.* 7, 161–173 (2001).
108. Aktar, D. Sengupta, A. Chowdhury, Impact of pesticides use in organic farming: Their rewards and hazards. *Interdiscip. Toxicol.* 2, 1–12 (2009)002E

109. Qin, S. Liu, Y. Guo, Q. Liu, J. Zou, Methane and nitrous oxide emissions from Eco-natural and predominant rice cropping systems in Southeast China. *Biol. Fert. Soils* 46, 825–834 (2010).

